

Program/Course: M. Tech.
Subject: Computer Aided Design Methods
Subject Code: CE-507
Paper ID: E0854

Time Allowed: 03 Hours

Max. Marks: 100

Note:

1. Attempt any five questions.
2. Any missing data may be assumed appropriately

- Q1. a) What are the roles played by the designer and computer in a Computer Aided Design process? 12
b) Name various devices required for a CAD office, and clearly explain the function of each device. 8
- Q2. a) How images are displayed on monitors? 5
b) Tabulate coordinates of pixels, which needed to draw a circle of diameter 10 units with center at (10,7) of a given raster display of 20x14 resolution (making use of a graph paper supplied) and draw it on graph paper. Name the algorithm used. 15
- Q3. a) What do you understand by Flow Chart, how it help in automating analysis / design task with the help of computers? 8
b) Write short notes on: 12
1. Translation of graphic entities
2. Clipping in graphic windows
- Q4. Explain various techniques to represent 3-D objects in Computers? What do you understand by hidden surface elimination, and how it is achieved? 20
- Q5. a) How raster graphics differ from vector graphics. Discuss their application and suitability. 5
b) Discuss 5 input devices (of a Graphics Workstation) with their advantages and limitations. 15
- Q6. a) Write down steps (or draw flow chart) to calculate design shear stress for concrete mix ranging from M15 to M 60 (with interval of 5), and percentage steel ranging from 0.1 to 4.0 (with interval of 0.05). The design shear stress is given by: 10
$$\tau_v = \frac{0.85 \sqrt{0.8 f_{ck}} (\sqrt{1+5\beta} - 1)}{6\beta} \quad \text{where} \quad \beta = \frac{0.8 f_{ck}}{6.89 p_t}$$
$$\beta \text{ can not less than 1. } P_t = \frac{100 A_s}{b_w d}$$

b) Write a computer program for the shear stress calculation, as required in Q6 (a). 10
- Q7. Explain the procedure to formulate stiffness matrix for a 2D frame member in member coordinate system, and then to transfer the same to global coordinate system. Write a pseudo code for the same. 20
- Q8. What are various types of Data Base Management Systems. Discuss their structure, relative advantages and disadvantages. How data is stores and retrieved? 20

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